UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
SCHAFFER, JONATHAN C

ART UNIT	PAPER NUMBER
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	02/09/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 02/09/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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	Application No.	Applicant(s)
Office Action Summary	10/656,921	CHO, SEONG-WON
	Examiner	Art Unit	
	Jonathan C. Schaffer	2624	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). ·
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.
2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-35_ is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) _1-35_ is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☒ All b) ☐ Some * c) ☐ None of:
       1. ☐ Certified copies of the priority documents have been received.
       2. ☐ Certified copies of the priority documents have been received in Application No. _____.
       3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   Applicant's response to the last Office Action, filed 09/08/2006, has been entered and made of record.

2.   Applicant has amended claim 1, 3, 4, 19-25, 32, 34 and 35. Claim 1-35 are currently pending.

Response to Arguments

3.   Applicant's arguments filed 09/08/2006 have been fully considered but they are not persuasive. In response to the Applicant's argument that "Daugman does not teach or suggest any methods or processes that determine the outer boundary using image information of [the] inner boundary", the Examiner would like to direct the Applicant's attention to column 7, lines 23-56 where the method for determining the outer boundary is disclosed. The outer boundary is determined by finding the maximum in the rate of change, which is considered to be a maximum among differences, of the luminance as the radius of expansion increases. Further it is disclosed that the pupillary radius is considered in the equation thus denoting the inclusion of the inner boundary (the portion of the iris image or eye image which borders the pupil) and the luminance data from the entirety of the iris along the radius which includes the luminance data of the inner boundary which is infact a method that determines the outer boundary using image information of the inner boundary contrary to the Applicant's assertion that no such information is included in the determination of the outer boundary. Thus the original rejection remains applicable and still stands as previously applied.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5.   Claims 1, 3-35 rejected under 35 U.S.C. 102(b) as being anticipated by Daugman (U.S. Patent

Number 5,291,560).

1. A method of processing an image of an eye, the method comprising:

providing data representing an image of an eye comprising an image of an iris of the eye,

the iris image being substantially annular and defined between inner and outer

boundaries, the eye image comprising a plurality of pixels, the eye image data comprising

location information and image information for each pixel of the eye image;

Daugman discloses acquiring the image 10, the iris image being annular (col. 3, l. 1-2), defining

the pupillary (inner) iris boundary 12, the limbic (outer) iris boundary 14, the eye image

comprising a plurality of pixels (col. 6, l. 34) and a coordinate system 16 for all pixels in the eye

image.

providing location information of the inner boundary of the iris image;

Daugman discloses determining the location information of the inner boundary of the iris image

(col.5, l. 12-30)

comparing the image information of a pixel on the inner boundary with the image

information of pixels of the eye image; and

Daugman discloses comparing the image information of the inner boundary with the image

information of the rest of the eye image (col. 7, l. 57-63).

determining a pixel is on the outer boundary of the iris image when a difference between the image information of that pixel and the image information of the pixel on the inner boundary becomes a maximum among differences of the image information.

Daugman discloses the determination of the outer boundaries of the iris using differences (col. 7, l. 30-56).

3. The method of Claim 1, further comprising:

obtaining data of a substantial portion, but not all, of the iris image; and

Daugman discloses obtaining data of a substantial portion but not all of the iris image especially the parts that would include eyelashes or eyelids (col. 2, l. 64-68 & Fig. 2).

processing the data of the substantial portion to obtain an iris pattern.

(col. 3, l. 1-6)

4. The method of claim 3, wherein the data comprises the location information and the image information of a pixel within the portion.

A coordinate system is established 16 and analysis bands 18 are created (Fig. 1).

5. The method of claim 3, wherein the substantial portion of the iris image is from about 25% to about 95% of an area of the iris image.

Daugman discloses in Fig. 2 an iris covered by bands, which indicate the area of the iris being considered, and these bands cover about 65% of the iris which is within the range of 25% to 95% of the area of the iris image.

6. The method of claim 3, wherein the substantial portion of the iris image is from about 40% to about 85% of an area of the iris image.

Daugman discloses in Fig. 2 an iris covered by bands, which indicate the area of the iris being considered, and these bands cover about 65% of the iris which is within the range of 40% to 85% of the area of the iris image.

7. The method of claim 3, wherein the substantial portion of the iris image is from about 50% to about 75% of an area of the iris image.

Daugman discloses in Fig. 2 an iris covered by bands, which indicate the area of the iris being considered, and these bands cover about 65% of the iris which is within the range of 50% to 75% of the area of the iris image.

8. The method of claim 3, wherein the substantial portion of the iris image is from about 55% to about 65% of an area of the iris image.

Daugman discloses in Fig. 2 an iris covered by bands, which indicate the area of the iris being considered, and these bands cover about 65% of the iris which is within the range of 55% to 65% of the area of the iris image.

9. The method of claim 3, wherein the substantial portion of the iris image is substantially annular.

As can be seen in Fig. 2 the

10. The method of claim 3, wherein the substantial portion is annular and defined from the

inner boundary to an imaginary closed line between the inner and outer boundaries.

As can be seen in Fig. 2 a substantial portion of the iris image is annular and is defined from the

inner boundary to an imaginary closed line between the inner and outer boundaries.

11. The method of claim 10, wherein the imaginary closed line is substantially parallel to

the inner boundary.

Fig. 2

12. The method of claim 11, wherein a tangent at a point on the inner boundary is

substantially parallel to a tangent at a point on the imaginary line that is on a line

perpendicular to the tangent at the point on the inner boundary.

Fig. 2

13. The method of claim 3, wherein the substantial portion is annular and defined from an

imaginary closed line between the inner and outer boundaries to the outer boundary.

Fig. 2

14. The method of claim 13, wherein the imaginary closed line is substantially parallel to

the outer boundary.

Fig. 2

15. The method of claim 3, wherein the substantial portion is annular and defined between a first imaginary closed line and a second imaginary closed line, wherein the first imaginary line is drawn between the inner and outer boundaries, and wherein the second imaginary line is drawn between the first imaginary line and the outer boundary.

Daugman's figure 2 shows multiple lines including one between the inner and outer boundaries, and another between that line and the outer boundary.

16. The method of claim 15, wherein the first and second lines are substantially parallel to each other.

Fig. 2

17. The method of claim 3, wherein the substantial portion of the iris image is not annular.

Daugman discloses an iris image wherein the substantial portion of the image is not annular as seen in Fig. 2 in the upper left-hand corner where the iris image is coded into a block.

18. The method of claim 3, wherein the data of the substantial portion is transformed into a polar coordinate form.

(col. 6, I. 36-37)

19. A device for processing an image of an eye, comprising:

means for providing data representing an image of an eye comprising an image of an iris of the eye, the iris image being substantially annular and defined between inner and outer boundaries, the eye image comprising a plurality of pixels, the eye image data comprising location information and image information for each pixel of the eye image;

Daugman discloses acquiring the image 10, the iris image being annular (col. 3, l. 1-2), defining the pupillary (inner) iris boundary 12, the limbic (outer) iris boundary 14, the eye image comprising a plurality of pixels (col. 6, l. 34) and a coordinate system 16 for all pixels in the eye image.

means for providing location information of the inner boundary of the iris image;

Daugman discloses determining the location information of the inner boundary of the iris image (col.5, l. 12-30).

means for comparing the image information of a pixel on the inner boundary with the image information of pixels of the eye image, thereby determining a pixel is on the outer boundary of the iris image when a difference between the image information of that pixel and the image information of the pixel on the inner boundary becomes a maximum among differences of the image information;

Daugman discloses the determination of the outer boundaries of the iris using differences (col. 7, l. 30-56).

means for obtaining data of a substantial portion, but not all, of the iris image; and

See the rejection of claim 3, second limitation.

means for processing the data of the substantial portion to obtain an iris pattern.

See the rejection of claim 3, third limitation.

20. An eye image processing system, comprising:

a first circuit configured to process the method of Claim 1 and configured to identify data of the iris image from the image of the eye; and

Daugman's method is a computer-implemented method in which at some point the instructions will be on a chip, it is an inherent part of the system. See the rejection of claim 3, third limitation.

a second circuit configured to process the iris image data so as to obtain data of a substantial portion, but not all, of the iris image for further processing.

Daugman's method is a computer-implemented method in which at some point the instructions will be on a chip, it is an inherent part of the system. See the rejection of claim 3, second limitation.

21. The system of claim 20, wherein the first and second circuits are integrated in a circuit board or a chip.

Integrated circuits are an inherent part of a computer system including the system used by Daugman.

22. The system of Claim 20, further comprising:

a third circuit configured to process the data of the substantial portion of the iris image so as to determine whether the data of the iris image matches a pre-registered data.

See the rejection of claim 3, second and third limitation. Fig 1, 26 and 28 indicate the comparison and identification of the iris image.

23. The method of Claim 1, further comprising:

obtaining data of the iris image; and

Daugman discloses obtaining the iris image (col. 12, l. 54-63).

producing at least one modified iris image data with use of the data of the iris image, the modified iris image data representing an iris image that is rotated by an angle about a point on the iris image.

(col. 12, l. 54-63)

24. The method of claim 23, wherein the point of rotation is located at a substantially central position of the image of the iris.

(col. 12, l. 54-63), Fig. 2

25. The method of claim 23, further comprising processing the iris image data to determine whether the iris image data matches a pre-registered iris image data.

(col. 12, l. 54-63)

26. The method of claim 23, further comprising processing the modified iris image data to determine whether the modified iris image data matches a pre-registered iris image data.

(col. 12, l. 54-63 & col. 13, l. 8-20)

27. The method of claim 23, wherein the modified iris image data represents an iris image that is rotated in a clockwise direction.

(col. 12, l. 54-63)

28. The method of claim 23, wherein the modified iris image data represents an iris image that is rotated in a counter-clockwise direction.

(col. 12, l. 54-63)

29. The method of claim 23, wherein a plurality of modified iris image data are produced.

(col. 12, l. 54-63)

30. The method of claim 23, wherein the modified iris image data is processed in accordance with a wavelet transform method.

(Fig. 3 & col. 10, I. 8-11)

31. The method of claim 23, wherein the original iris image data is processed in accordance with a wavelet transform method.

(Fig. 3 & col. 10, I. 8-11)

32. An eye image processing system, comprising:

means for providing data representing an image of an eye comprising an image of an iris of the eye, the iris image being substantially annular and defined between inner and outer boundaries, the eye image comprising a plurality of pixels, the eye image data comprising location information and image information for each pixel of the eye image;

Daugman discloses acquiring the image 10, the iris image being annular (col. 3, I. 1-2), defining the pupillary (inner) iris boundary 12, the limbic (outer) iris boundary 14, the eye image comprising a plurality of pixels (col. 6, I. 34) and a coordinate system 16 for all pixels in the eye image.

means for providing location information of the inner boundary of the iris image;

Daugman discloses determining the location information of the inner boundary of the iris image (col.5, I. 12-30).

means for comparing the image information of a pixel on the inner boundary with the image information of pixels of the eye image, thereby determining a pixel is on the outer boundary of the iris image when a difference between the image information of that pixel

and the image information of the pixel on the inner boundary becomes a maximum among

differences of the image information;

Daugman discloses the determination of the outer boundaries of the iris using differences (col. 7,

l. 30-56).

means for identifying data of the iris image; and

Daugman discloses identifying data of an iris image (col. 12, l. 29-63).

means for producing at least one modified iris image data based on the data of the iris

image, the modified iris image data representing an iris image that is rotated by an angle

about a point on the image.

(col. 12, l. 54-63)

33. The device of claim 32, further comprising:

means for determining whether the modified iris image data matches a pre-registered data.

(col. 12, l. 54-63)

34. An eye image processing system, comprising:

a first circuit configured to process the method of Claim 1 and configured to identify data

of the iris image from the image of the eye; and

Daugman's method is a computer-implemented method in which at some point the instructions will be on a chip, it is an inherent part of the system. See the rejection of claim 3, third limitation.

a second circuit configured to process the iris image data so as to produce at least one modified iris image data based on the data of the original iris image, the modified iris image data representing an iris image that is rotated by an angle about a point on the original image.

Daugman's method is a computer-implemented method in which at some point the instructions will be on a chip, it is an inherent part of the system. See the rejection of claim 3, second limitation.

35. The system of Claim 34, further comprising:

a third circuit configured to process the modified iris image data to determine whether the modified iris image data matches a pre-registered data.

Daugman's method is a computer-implemented method in which at some point the instructions will be on a chip, it is an inherent part of the system. See the rejection of claim 23, second limitation.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at

the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.   Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daugman as applied to claim 1 above.

> *2. The method of claim 1, wherein the location information of the inner boundary is obtained with use of a Canny edge detection method.*

Daugman discloses edge detection as discussed in claim 1. It would have been obvious to one of ordinary skill in the art at the time of the invention to use Canny edge detection for the edge detection method. The examiner is taking official notice that Canny edge detection was and still is considered the optimal edge detection method and therefore would the logical choice of edge detection methods available.

Conclusion

8.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan C. Schaffer whose telephone number is (571)272-0603. The examiner can normally be reached on 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571)272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

.Information regarding the status of an application may be obtained from the Patent Application . Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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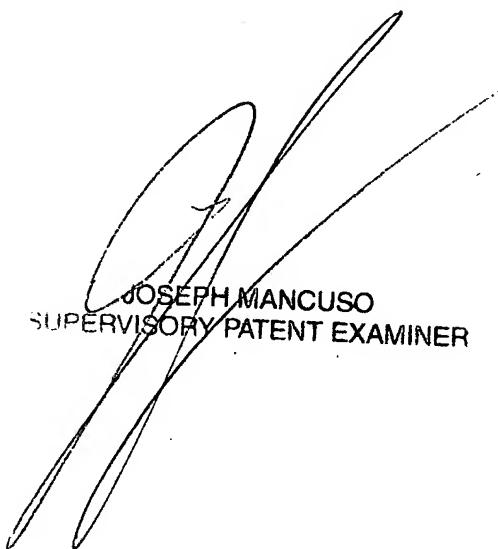
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